THE AMERICAN
JOURNAL OF PHARMACY

OCTOBER, 1907.

CHEMICAL EXAMINATION OF LIPPIA SCABERRIMA, SONDER ("BEUKESS BOSS").[1]

By Frederick B. Power and Frank Tutin.

A South African plant, which is known in its native country as "Beukess Boss," was brought to our notice as being worthy of investigation on account of its reputed medicinal value. It is found in the Orange River Colony, in the neighborhood of Kroonstad, where it is regarded as possessing remarkable hæmostatic properties, together with a slightly tonic and aperient action, and is therefore used in the treatment of hæmorrhoids. Through the kindness of Mr. E. M. Holmes, F.L.S., Curator of the Museum of the Pharmaceutical Society of Great Britain, the plant was identified as *Lippia scaberrima*, Sonder, belonging to the family of *Verbenaceæ*. A botanical description of this species of *Lippia* is contained in *Linnaea*, xxiii (1850), 87. Afr. austr.

With regard to the origin or meaning of the vernacular name "Beukess Boss," we have been informed that "Beukess" is the name of an old Dutch family who formerly prepared a decoction of the plant for medicinal use, whereas "Boss" is a corruption of the Boer name of "Bosch," meaning a bush. Hence in time the plant became known as "Beukess Boss" or "Beukess Bush."

A number of species of the genus *Lippia* have heretofore attracted attention on account of their aromatic properties, which are due to the presence of essential oils. One of the best known of these is the *Lippia citriodora*, Kunth (*Verbena triphylla*, L'Heritier), the so-called

[1] Translated from a communication to the *Archiv der Pharmacie*, 1907, 245, pp. 337-350, from the Wellcome Chemical Research Laboratories, London.

"lemon-verbena," which affords the genuine verbena oil (compare Gildemeister and Hoffmann, "Die ætherischen Oele," p. 774, and Beilstein's *Handbuch der org. Chemie, Ergänzungsband*, III, p. 380). Some South American species of *Lippia*, which likewise yield aromatic essential oils, have recently been brought to notice, namely: *L. urticoides*, *L. geminata*, and *L. microcephala* (*Ber. d. deutsch. Pharm. Ges.*, **14**, p. 468).

Podwissotzki (*Pharm. Zeit. f. Russl.*, 1882, **21**, 926) has recorded the results of an examination of the leaves and stems of *Lippia mexicana*, from which on distillation with water he obtained an essential oil possessing a sweet taste, reminding of that of Italian fennel, together with a crystalline, camphor-like substance (m. p. 25-30° C.), designated as *lippiol*. Although one analysis was recorded of this substance (C = 75·81; H = 12·43; O = 10·20 per cent.), the figures are evidently quite inconclusive, and no further evidence was afforded of its composition, nor was its chemical character determined. The presence of a small amount of tannin in the plant was likewise noted.

Maisch (AMER. JOUR. PHARM., 1885, **57**, p. 330), in commenting "on some useful plants of the natural order of Verbenaceæ," stated that he was unable to find any reference in botanical works to a plant bearing the name of *Lippia mexicana*, and therefore expressed the opinion that the material examined by Podwissotzki (*loc. cit.*) was either obtained from the labiate plant *Cedronella mexicana*, Benth., which has been admitted into the Mexican Pharmacopœia under the name of *toronjil*, or that it was *Lippia citriodora*, Kunth (compare also *Proc. Amer. Pharm. Assoc.*, 1876, **24**, p. 772). In the "National Standard Dispensatory," 1905, p. 1630, it is stated that "the drug *Lippia mexicana* is the leaves of *L. dulcis*, Trev., var. *dulcis*, of Mexico and Central America."

EXPERIMENTAL.

The material used in this investigation was specially collected for us in South Africa, and consisted of the air-dried stems and leaves of the plant, which was botanically identified as *Lippia scaberrima*, Sonder. The herb possesses an agreeable aromatic odor, reminding of both lavender and sage.

Test for an Alkaloid.—Twenty-five grammes of the finely ground herb were macerated with Prollius' fluid, and the resulting liquid

evaporated. The residue left by the latter, when extracted with acidulated water, gave no reaction with alkaloidal reagents.

Quantitative Estimation of the Tannin.—A quantity (17·3 grammes) of the finely ground herb was extracted with successive small portions of boiling water, and the cold filtered liquid diluted to the measure of 500 c.c. 100 c.c. of this liquid, when evaporated, and the residue dried in a water-oven until of constant weight, yielded 0·5402 gramme of extract; 100 c.c. of the same liquid, after treatment with hide powder, yielded 0·3498 gramme of extract. The amount of substance absorbed by the hide powder was therefore 0·1904 gramme, which would correspond to 5·5 per cent. of *tannic matter* in the air-dried herb.

Extraction with Alcohol.—A quantity (7600 grammes) of the dried herb was extracted by continuous percolation with hot alcohol, and the greater portion of the alcohol removed. The resulting thin extract, which had a dark green color and an aromatic odor, was brought into a large flask and distilled in steam until oily drops were no longer visible in the condenser. There then remained in the distillation flask a quantity of resinous substance (*A*) and a dark-colored aqueous liquid (*B*), which were separately examined.

Examination of the Steam Distillate.

The distillate was a milky liquid, on the surface of which a small quantity of a greenish-yellow essential oil had separated. It was extracted several times with ether, the ethereal liquid washed with water, dried with anhydrous sodium sulphate, and the ether removed. The residual oil was distilled under the ordinary pressure, when it nearly all passed over between 220° and 230° C., and amounted to 19 grammes, corresponding to 0·25 per cent. of the weight of dried herb.

This *essential oil* had a brownish-yellow color, an odor resembling that of the herb, and was distinctly camphoraceous. It was readily soluble in 70 per cent. alcohol, and its solution gave a slight brown color with ferric chloride. It possessed the following constants: d 15°/15° C. = 0·9500; a_D + 7°36′ in a 1 dcm. tube.

The aqueous portion of the distillate, from which the essential oil had been removed by means of ether, contained a small amount of a mixture of acids, which was found to consist chiefly of *formic* and *butyric acids*.

Examination of the Resins (A).

The mass of black, tarry resins in the distillation flask was separated from the aqueous liquid, then thoroughly washed with hot water, and dried. It amounted to 275 grammes, corresponding to 3·6 per cent. of the weight of air-dried herb. This crude resin was mixed with purified sawdust, and extracted successively with light petroleum, ether, chloroform, ethyl acetate, and alcohol. All these products were separately examined.

I. Petroleum Extract of the Resins.

This extract, which constituted by far the greater portion of the total resin, was a dark green, soft solid, and amounted to 170 grammes. Having ascertained by a preliminary experiment that it contained nothing of a basic, acidic, or phenolic nature, it was hydrolysed by boiling with an alcoholic solution of 50 grammes of potassium hydroxide. On subsequently removing the alcohol, a dark green mass was obtained, which was mixed with water, and then repeatedly extracted with ether. When shaking with the first portion of ether it was observed that the liquids contained a small amount of a flocculent precipitate. This was removed by filtration, and found to consist largely of the potassium salt of a fatty acid, but the amount of acid (m. p. about 81–83° C.) obtained from it was too small to admit of its being purified. The ethereal extract of the alkaline liquid was washed, dried, and the ether removed, when a semi-solid, yellow residue, weighing 50 grammes, was obtained. This was distilled under 15 mm. pressure, when the following fractions were collected: 140–205°; 205–265°; 265–330° C./15 mm.

Fractions 140–205° and 205–265° C./15 mm.—These fractions were somewhat thick, yellowish oils, but the one of higher boiling point contained a small amount of a crystalline solid. This was collected on a filter, and recrystallized from ethyl acetate, when it was obtained in beautiful leaflets, melting sharply at 59° C.

0·0600 gave 0·1865 CO_2 and 0·0787 H_2O. C = 84·8; H = 14·6.

$C_{27}H_{56}$ requires C = 85·3; H = 14·7 per cent.

This substance agrees in melting point and composition with the hydrocarbon *heptacosane*, and is doubtless identical with it.

The oily liquid from which this hydrocarbon had been separated was then mixed with the fraction of lower boiling point, and the mixture fractionally distilled under 20 mm. pressure, when it was

resolved principally into two fractions, boiling at 145-175° and 200-230° C./20 mm. respectively. Both these fractions were light yellow, fairly mobile oils, possessing a somewhat fragrant odor. The one of lower boiling point (145–175° C./20 mm.) gave on analysis the following result:

0.1130 gave 0.3274 CO_2 and 0.1100 H_2O. C = 79.0; H = 10.8.

$C_{11}H_{18}O$ requires C = 79.5; H = 10.8 per cent.

A portion of this product was boiled with acetic anhydride, the product distilled, and then analyzed.

0.1054 gave 0.2970 CO_2 and 0.0968 H_2O. C = 76.9; H = 10.2.

$C_{11}H_{17} - O - CO - CH_3$ requires C = 75.0; H = 9.6 per cent.

The iodine value of the acetylated product was then determined.

0.2349 absorbed 0.1723 iodine. Iodine value = 73.4.

$C_{11}H_{17} - O - CO - CH_3$, containing one double linking, would have an iodine value of 122.1.

The fraction boiling at 200–230° C./20 mm. gave on analysis the following result:

0.0854 gave 0.2513 CO_2 and 0.0916 H_2O. C = 80.3; H = 11.9.

$C_{14}H_{24}O$ requires C = 80.8; H = 11.5 per cent.

It was then acetylated, and the product distilled and analyzed.

0.1057 gave 0.3006 CO_2 and 0.1041 H_2O. C = 77.6; H = 10.9.

$C_{14}H_{23} - O - CO - CH_3$ requires C = 76.8; H = 10.4 per cent.

0.2045 absorbed 0.1991 iodine. Iodine value = 97.4.

$C_{14}H_{23} - O - CO - CH_3$, containing one double linking, requires an iodine value of 101.6.

These results show that the above fractions did not consist of pure substances, but evidently contained *alcohols* which appear to possess the general formula $C_nH_{2n-4}O$, with one double linking. The viscid substances which usually accompany the phytosterols in small amount possess an odor resembling that of the above-mentioned alcohols, and they are probably similar in character. The amount of these fractions was too small to permit of their further purification.

Fraction 265-330° C./15 mm.—This fraction was by far the largest obtained. It almost all passed over above 290° C./15 mm., and, on cooling, solidified completely. It was crystallized three times from ethyl acetate, when a substance was obtained in the form of silky leaflets, melting at 68° C.

0.0757 gave 0.2356 CO_2 and 0.0986 H_2O. C = 84.9; H = 14.5.

$C_{31}H_{64}$ requires C = 85.3; H = 14.7 per cent.

This substance was thus identified as the hydrocarbon *hentriacontane.*

The first mother liquors from this hydrocarbon were of a dark brown color, and, after standing for some days, deposited a quantity of a substance in the form of crystalline plates. This was separated by filtration, and recrystallized from ethyl acetate containing a little dilute alcohol, when it was obtained in handsome plates, which melted at 134° C., and gave with acetic anhydride and sulphuric acid the color reaction characteristic of the phytosterols.

0.0970, heated at 105° C., lost 0.0048 H_2O. $H_2O = 4.9$.

0.0922 of anhydrous substance gave 0.2813 CO_2 and 0.0978 H_2O. $C = 83.2$; $H = 11.8$.

$C_{27}H_{46}O$, H_2O requires $H_2O = 4.5$ per cent.

$C_{27}H_{46}O$ requires $C = 83.9$; $H = 11.9$ per cent.

This substance was apparently identical with the *phytosterol* obtained from the fatty oil of the seeds of *Gynocardia odorata*, R. Br. (*Jour. Chem. Soc.*, 1905, **87**, p. 898), as a mixture of the two substances melted at the same temperature (134° C.) at which each separately fused.

Maurenbrecher and Tollens (*Ber. d. deutsch. chem. Ges.*, 1906, **39**, p. 3581) have noted a color reaction, first observed by Rauchwenger and Neuberg, which is stated to differentiate between cholesterol and the phytosterols, and is conducted as follows:—A small portion of the substance to be tested, together with a trace of rhamnose, is dissolved in 1.5 c.c. of absolute alcohol, and concentrated sulphuric acid then cautiously added, when, if the substance be cholesterol, a raspberry-red color is produced at the junction of the two liquids, and afterwards extends throughout the whole. According to Rauchwenger and Neuberg, this reaction is not afforded by phytosterol. It was observed, however, by Maurenbrecher and Tollens (*loc. cit.*) that the substance isolated by them from cacao butter, although having the melting point (137° C.) and other characters of a phytosterol, gave the above-mentioned reaction, and they were therefore unable to decide whether this was not due to some adhering cholesterol. In order to ascertain the value of this test, we have applied it to pure cholesterol (m. p. 144–147° C., from Schuchardt), to the phytosterol from the species of *Lippia* under examination, to that from Gynocardia oil, and also to "rhamnol," $C_{20}H_{34}O$ (m. p. 135–136° C.),—the phytosterol occurring in Kô-sam seeds (*Pharm. Jour*,

1903, **71**, p. 186) and in cascara sagrada (*Proc. Amer. Pharm. Assoc.*, 1904, **52**, p. 299), when a precisely similar color was observed in every case. Furthermore, it was ascertained that the color was produced equally well in the absence of the trace of rhamnose. Since making these comparative tests, we have observed that similar experiments have been conducted by Ottolenghi (*Atti R. Accad. Lincei*, 1906 [V], 15, i, 44–47, and *Jour. Chem. Soc. Abstr.*, 1906, **90**, ii, p. 311), and with the same results. This test must therefore be declared valueless as a means of distinguishing between cholesterol and the phytosterols.

The alkaline, aqueous liquid, from which the above-described alcohols and hydrocarbons had been removed by means of ether, was then concentrated, acidified with sulphuric acid, and distilled in steam. The distillate contained a small quantity of an oily acid, which was extracted with ether and converted into its potassium salt, and from the latter six fractions of silver salt were successively precipitated. These silver salts were dried in a vacuum, and analyzed.

1st	fraction,	0·2703	gave	0·1396 Ag.	Ag = 51·6
2d	"	0·3047	"	0·1585 Ag.	Ag = 52·0
3d	"	0·2830	"	0·1474 Ag.	Ag = 52·1
4th	"	0·2509	"	0·1306 Ag.	Ag = 52·1
5th	"	0·1887	"	0·0988 Ag.	Ag = 52·2
6th	"	0·0947	"	0·0498 Ag.	Ag = 52·6

$C_5H_9O_2Ag$ requires Ag = 51·7 per cent.
$C_4H_7O_2Ag$ " Ag = 55·4 " "

The acid removed by ether from the steam distillate therefore consisted essentially of a *valeric acid*, and, on examining the aqueous liquid from which it had been separated, it was found to contain some *formic acid* together with a little *butyric acid.*

Isolation of a New Crystalline Alcohol, Lippianol, $C_{25}H_{35}O_3 — OH$.

The liquid in the distillation flask, from which the above-described volatile acids had been obtained by steam distillation, was shaken with ether, when it was observed that a small quantity of a dark green substance remained undissolved. This was collected on a filter and dried on a porous tile, after which it was dissolved in ethyl acetate and treated with animal charcoal, when, after filtering the liquid, a substance separated in the form of colorless needles. The

examination of this substance is described below, as a further quantity of it was subsequently obtained.

The ethereal liquid, from which the above-mentioned solid had been removed, was separated from the aqueous liquid, washed, dried and evaporated. The residue, which consisted of a dark green, sticky mass, was treated with several portions of warm, light petroleum to remove the fatty acids it contained, the residual green, resinous product mixed with a small amount of warm ether, and then allowed to stand. At the end of a few days it had deposited a quantity of a granular solid, and this was separated from the green, uncrystallizable syrup. After solution in alcohol, purification with animal charcoal, and several recrystallizations, this substance was obtained in the form of handsome, white needles, which were found to be identical with those above mentioned. This substance is not an acid, as it was unacted upon by aqueous alkalies. When boiled with acetic anhydride it gave an acetyl derivative, which was obtained in the form of an uncrystallizable syrup. It is evident, therefore, that it is of an alcoholic nature, and, as it is not identical with any substance hitherto described, the name *Lippianol*[1] may appropriately be assigned to it.

Lippianol is sparingly soluble in alcohol, and very sparingly so in ethyl acetate, but crystallizes from both these solvents in colorless needles, which melt, with decomposition, at 300–308° C.

0.0861 gave 0.2361 CO_2 and 0.0712 H_2O. C = 74.8; H = 9.2.
0.0873 " 0.2391 CO_2 " 0.0724 H_2O. C = 74.7; H = 9.2.
$C_{25}H_{36}O_4$ requires C = 75.0; H = 9.0 per cent.
$C_{25}H_{38}O_4$ " C = 74.6; H = 9.5 " "

It is evident from these analyses that lippianol possesses the empirical formula $C_{25}H_{36}O_4$. It is optically active, and a determination of its specific rotatory power gave the following result:

0.1123, dissolved in 25 c.c. of absolute alcohol, gave $a_D + 0° 35'$ in a 2 dcm. tube, whence $[a]_D + 64.9°$.

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[1] The designation *Lippianol* has been adopted in view of the fact that, as already noted, the name *Lippiol* has previously been given by Podwissotzki (*loc. cit.*) to a crystalline substance of indefinite character and composition obtained by the distillation of the so-called *Lippia mexicana*.

As already stated, lippianol is unaffected by aqueous alkalies, but, when boiled with a strong solution of potassium hydroxide containing some alcohol, it forms a compound with the alkali which does not separate even after the removal of the alcohol, and, on acidifying this liquid, the lippianol is precipitated unchanged. Although obtained from that portion of the resins which was extracted by light petroleum, lippianol is quite insoluble in this solvent, and cannot, therefore, have occurred in the plant in a free state. The fact that it was not obtained in association with the other alcohols already described, is owing to its above-mentioned property of forming a compound soluble in water when treated with alcoholic potash. The amount of lippianol obtained (3·5 grammes) is equivalent to about 0·05 per cent. of the weight of the air-dried plant.

Methyl Lippianol, $C_{25}H_{35}O_3 — OCH_3$.—As the acetyl derivative of lippianol was unsuitable for the purpose of ascertaining the number of hydroxyl groups contained in this alcohol, and as a determination by Zeisel's method showed the absence of methoxyl groups, about 1 gramme of the lippianol was completely methylated by treatment with sodium methoxide and methyl iodide. The number of hydroxyl groups present in the original substance was then ascertained by determining the percentage of methoxyl in the resulting derivative.

Methyl lippianol crystallizes from dilute alcohol in colorless needles, which melt, with decomposition, at about 260° C. An estimation of the methoxyl groups, by means of Perkin's modification of Zeisel's method (*Jour. Chem. Soc.*, 1903, **83**, p. 1367), gave the following result:

0·3034 gave 0·1725 AgI. $CH_3O = 7·5$.
$C_{25}H_{35}O_3 — OCH_3$ requires $CH_3O = 7·5$ per cent.

Lippianol is therefore a monohydric alcohol.

Examination of the Non-volatile Acids.

The light petroleum liquid containing the non-volatile fatty acids, which was separated from the product from which the lippianol was obtained, as above described, was washed, dried and evaporated. The residue, which weighed 50 grammes, was distilled under a pressure of 15 mm., when it passed over between 235° and 265°, and crystallized on cooling. It was then dissolved in a little warm

ethyl acetate, and the solution allowed to cool, after which the crystalline acid which had separated was collected on a filter. These crystals first melted at 53° C., but after repeated crystallization from ethyl acetate the melting point was raised to 74° C., after which it remained constant.

0·1015 gave 0·2844 CO_2 and 0·1176 H_2O. C = 76·4; H = 12·9.
$C_{20}H_{40}O_2$ requires C = 76·9; H = 12·8 per cent.

It is evident that this substance was *arachidic acid.*

The mother-liquors from this arachidic acid were concentrated, when a further quantity of crystals was obtained. This was repeatedly recrystallized from a variety of solvents, but the melting point could not be raised above 54° C. It had the appearance of a mixture, and an analysis indicated that it consisted of *palmitic* and *stearic acids.*

The original filtrate from these solid acids contained a considerable quantity of an oil, which was found to be a mixture consisting largely of unsaturated acids. It was, therefore, converted into the lead salts, and the latter treated with ether and filtered. The ethereal solution thus obtained was shaken with concentrated hydrochloric acid, the mixture filtered, and the separated ethereal liquid washed, dried and evaporated. The unsaturated acids were thus obtained as a light yellow oil, which, on distillation under 15 mm. pressure, passed over between 225° and 245° C.

0·0969 gave 0·2742 CO_2 and 0·1001 H_2O. C = 77·2; H = 11·5.
$C_{18}H_{32}O_2$ requires C = 77·1; H = 11·4 per cent.
0·3270 absorbed 0·5215 iodine. Iodine value = 159·5.

An acid of the formula $C_{18}H_{32}O_2$, containing two double linkings, requires an iodine value of 181·4.

From these results it is evident that the unsaturated acids consisted largely of *linolic acid*, or of an acid isomeric with the latter.

II. Ether Extract of the Resins.

The portion of the resins soluble in ether was dark green in color, and amounted to 54·5 grammes. It contained a small quantity of a substance which was only very sparingly soluble in ether, and which, when dissolved in warm ethyl acetate, and the solution cooled, separated in the form of a white, amorphous powder, which melted and decomposed at 210–213° C.

The ethereal solution of the readily soluble portion of the extract, which was by far the greater part, was then shaken with a solution of sodium carbonate. This treatment caused the separation of the sodium compound of an acidic resin, in the form of a dark green, slimy mass, which was sparingly soluble in water. On treatment with sulphuric acid, this sodium compound yielded a quantity (40 grammes) of a resin, which, after solution in ethyl acetate, and purification with animal charcoal, was obtained in the form of an uncrystallizable, light-colored varnish. The ethereal liquid which had been extracted with sodium carbonate solution was treated with a 10 per cent. solution of sodium hydroxide, but this afforded only a small quantity of a tarry sodium compound, from which nothing crystalline could be obtained. The portion of the ether extract of the resins devoid of acidic properties still remained dissolved in the ether, and this solution was therefore washed, dried and evaporated. The dark green, resinous residue was allowed to stand for a few days, when it deposited a very small quantity of a granular substance, which, when separated from its solution in ethyl acetate, was yellowish in color, and apparently minutely crystalline. As this substance possessed the properties of a hydrocarbon, it was warmed on a water-bath with concentrated sulphuric acid during half an hour, in order to destroy any resinous impurities contained in it. After this treatment the substance was recovered, and was apparently in a state of greater purity, as it was then colorless. It melted at 80° C., and was doubtless a hydrocarbon of high molecular weight, probably possessing a formula approximating to $C_{39}H_{80}$.

III. Chloroform Extract of the Resins.

This was a dark green, soft solid, and weighed 24 grammes. It was redissolved in chloroform, and extracted with a solution of sodium carbonate. On acidifying the alkaline solution thus obtained, a brown powder was precipitated, which was collected and dried on a porous tile. This substance was then dissolved in alcohol, and purified by means of animal charcoal, when it was obtained in beautiful yellow needles, which melted and decomposed at about 268° C. The total amount obtained was less than 0·1 gramme, but it was analyzed with the following result:

0·0518 gave 0·1110 CO_2 and 0·0265 H_2O. C = 58·4; H = 5·7.

$C_{22}H_{26}O_{10}$ requires C = 58·7; H = 5·8 per cent.

The chloroformic liquid, after having been shaken with a solution of sodium carbonate, was treated with potassium hydroxide solution, and this caused the separation of a tarry potassium compound, but nothing crystalline could be obtained from it.

IV. Ethyl Acetate Extract of the Resins.

This was very small in amount, but afforded a minute quantity of a crystalline substance which melted at 123° C.

V. Alcohol Extract of the Resins.

This was a black resin, and amounted to 25 grammes. Nothing crystalline could be obtained from it.

Examination of the Aqueous Liquid (B).

The dark-colored, aqueous liquid which had been decanted from the cake of resins, as previously described, was extracted ten times with ether, and the yellow, ethereal liquid shaken with a solution of sodium carbonate. The alkaline liquid thus obtained was acidified with sulphuric acid, when a yellow solid was precipitated. This was collected on a filter, and crystallized from alcohol, when it was obtained in the form of yellow needles, possessing a silky lustre. This substance melted and decomposed at about 267° C., and on analysis afforded the following results:

0.0756 gave 0.1570 CO_2 and 0.0344 H_2O. C = 56.6; H = 5.0.
0.0803 " 0.1655 CO_2 " 0.0362 H_2O. C = 56.4; H = 5.0.

The percentage composition of this substance agrees within the limits of experimental error with that required for several possible empirical formulæ, but, as less than 0.3 gramme of the substance was obtained, it is impossible to decide which of these formulæ should be assigned to it. The substance does not contain nitrogen, and, so far as could be ascertained, it is not identical with any substance heretofore described. The ethereal liquid from which this substance had been removed by shaking with a solution of sodium carbonate only contained a small quantity of green resinous matter.

The aqueous liquid, which had been extracted with ether, was then treated with a slight excess of basic lead acetate, and the copious yellow precipitate collected on a filter. A portion of this precipitate was suspended in water and decomposed with hydrogen

sulphide; but on concentrating the filtrate only a dark-colored tarry mass was obtained, from which nothing crystalline could be isolated.

The filtrate from the basic lead acetate precipitate was freed from lead by means of hydrogen sulphide, and, after filtering, was concentrated under diminished pressure. The dark brown syrup thus obtained reduced Fehling's solution, and on treatment with phenylhydrazine acetate gave a small quantity of an osazone melting at 210° C. On allowing the syrupy liquid to stand for some time, a considerable quantity of crystals separated, but these were found to consist only of potassium and calcium sulphates. When warmed with potassium hydroxide it evolved ammonia, but did not give any precipitate with alkaloidal reagents. The syrup was therefore mixed with prepared sawdust, and the mixture dried in a vacuum over sulphuric acid, after which it was extracted in a Soxhlet apparatus with ethyl acetate. This removed a quantity of an uncrystallizable syrup, which did not reduce Fehling's solution until after it had been boiled with a dilute mineral acid, a behavior which indicated the possible presence of a glucoside. A quantity of the syrup removed by ethyl acetate was, therefore, diluted with an equal volume of water, 10 per cent. sulphuric acid added, and the mixture gently heated. When the temperature reached about 50° C. a dark-colored, flocculent substance was precipitated, which soon coalesced to a black resin. The mixture was then heated to the boiling point, diluted with water, and distilled in steam, when a slightly turbid distillate was obtained, from which ether removed a few drops of a liquid having a strongly aromatic odor. The distillation flask then contained a hard, black resin, which was insoluble in all the usual solvents and in alkalies, together with a brown aqueous liquid containing sugar, and this, after the removal of the sulphuric acid, afforded an osazone melting at 211° C. It was evident, therefore, that the ethyl acetate extract of the aqueous liquid contained a *glucoside* which is readily hydrolyzed by sulphuric acid; but the only definite hydrolytic product obtained was a sugar, which appeared to consist chiefly of optically inactive glucose.

SUMMARY.

This investigation has shown that *Lippia scaberrima*, Sonder, contains, besides resins and other amorphous products, the following substances:

(1) About 0·25 per cent. of an aromatic essential oil.

(2) Heptacosane, $C_{27}H_{56}$.

(3) Hentriacontane, $C_{31}H_{64}$.

(4) A very small amount of a paraffin, melting at 80° C.

(5) Phytosterol, $C_{27}H_{46}O$ (m. p. 134° C.).

(6) Unsaturated alcohols, possessing the probable general formula $C_nH_{2n-4}O$, and containing one double linking.

(7) Formic and butyric acids in a free state.

(8) Esters of formic, butyric, valeric, arachidic, linolic and other acids.

(9) A new, colorless, crystalline substance, *lippianol*, $C_{25}H_{36}O_4$, which has the characters of a monohydric alcohol, and was obtained in an amount of about 0·05 per cent.

(10) Two *yellow crystalline substances* in very small amount, both of which melt at about 267°, and also a trace of a crystalline substance melting at 123° C.

(11) A *glucosidal substance* which could not be isolated, and which, besides glucose, yielded only indefinite hydrolytic products.

(12) Glucose (chiefly the inactive form).

The authors desire to express their thanks to Mr. H. W. B. Clewer for his assistance in this investigation.

FIFTY-FIFTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

By Florence Yaple.

The fifty-fifth annual meeting of the American Pharmaceutical Association was held in New York City, September 2d to 7th, the Hotel Astor, Times Square, being the headquarters of the association.

For various reasons it was anticipated that the meeting would be of more than ordinary interest, as the holding of the convention in the metropolis, with all of its attractions, after a lapse of forty years; the important subjects to be brought up for discussion, including the educational problem in pharmacy; the relation of the pharmaceutical and medical professions, or, perhaps more properly, the relation of the American Medical Association and the American

Pharmaceutical Association, and the reorganization of the latter body.

Whether or not the results accomplished equaled the anticipations of the more sanguine members, this much can be said: The educational and legislative problems were considered in a manner, which, while not radical, yet indicates progress; and it is safe to assume that the two national associations of pharmacists and physicians never had a better understanding of their true relation and mutual needs, and that the time was never more auspicious for the accomplishment of tangible results through their united efforts.

FIRST GENERAL SESSION.

The first general session was called to order on Monday afternoon, September 2d, at 3 o'clock, by the president, Leo Eliel, of South Bend, Ind. The announcement made by the local secretary, Thomas P. Cook, that Mayor McClellan could not be present to welcome the members to the city caused considerable disappointment to some, which, however, was almost forgotten as the hearty words of welcome were spoken by Mr. Cook and other local members. Dr. William C. Alpers, speaking on behalf of the local entertainment committee, extended a hearty welcome to all—a welcome, he said, which came from the hearts of the 2,000 pharmacists of New York City.

Dr. Solomon Solis Cohen, of Philadelphia, delegate from the Section on Pharmacology of the American Medical Association, said, after extending to the members fraternal greetings, that for the past few years physicians and pharmacists have set themselves to correct some of their mutual errors. He said that it is the province of neither to criticise the other, but mutually to unite to correct these errors. Referring to the subject of pharmaceutical specialties, such as serums, certain galenicals and alkaloids, Dr. Cohen said that while it is recognized that these can be made better on a large scale and by those having special facilities, and for which due credit is given the manufacturers, the medical profession also recognize the necessity of the pharmacist as a scientific man.

On the other hand, he declared that he had nothing to say against trade, trade being the life of the country, and pointed out that business men themselves should resent the implication that business and ethics are incompatible.

Continuing, Dr. Cohen said that the dependence of the patient upon the physician is reflected by the dependence of the physician upon the pharmacist, and that apart from the physiologic method now much in vogue in the treatment of disease, physicians depend upon pharmacists to furnish that which exists in nature and that which art alone can produce. He therefore claimed that the members should not get together for recrimination, but to work for the inseparable progress of pharmacy.

Among the other delegates who spoke were Edward Williams, of Madison, Wis., delegate from the National Association of Retail Druggists; E. M. Roehrig, representing the Public Health and Marine Hospital Service, and Paul J. Waldner from the U. S. Navy.

Dr. H. W. Wiley, of the U. S. Department of Agriculture, was welcomed as an active member of the association, and in responding touched upon the subject of the efforts at improvement in pharmacy and medicine. He said that if it were not for the moral sentiment of the people no reforms could be effected; that every law which does not have moral sentiment back of it is a dead letter. He said that the Food and Drugs Act had been supported by the great organizations of the country, and that the American Pharmaceutical Association was one of the first to give encouragement to the work. He affirmed that trade is ethical, and in answer to the question, What is the life of business? replied, honor. Continuing, he said that the Government had no desire to punish any one, but only to control those who are dishonest, for the dishonest practices of a few will demoralize business. He said because 98 per cent. do an ethical business, Congress is able to control the 2 per cent. who are not honest.

At the request of President Eliel, Prof. Joseph P. Remington introduced Prof. José Guillermo Diaz, of the University of Havana, Cuba, who recently finished a translation of the U. S. Pharmacopœia into Spanish. Professor Diaz said that in his work in the University he had had occasion to refer to the U.S.P., and that he had translated many paragraphs for the use of his students. He praised the completeness and clearness of the work, and said that the pharmacists of Cuba are looking forward to the publication of the translated edition.

Prof. William M. Searby, of San Francisco, in responding to the addresses of welcome, spoke of the gratitude which the druggists

of California, who were victims of the earthquake, feel toward the druggists of the country for their generous assistance.

Thomas F. Main, of New York, chairman of the Committee on Credentials, reported that sixty-one organizations were represented by duly accredited delegates.

PRESIDENT'S ADDRESS.—Vice-president C. S. N. Hallberg occupied the chair while the president read his annual address.

The address contained several recommendations, which for the most part centered around the Pure Food and Drugs Act, and were presented "from the standpoint of the pharmacist in actual practice." The following extracts have been selected as showing the trend of the address:

"Without a doubt, the most important event of the past year was the enactment of the Pure Food and Drugs Act. For the first time since the establishment of this Government, has there been a law put on the national statutes which undertakes to control the truthful branding of foods and medicinal products, at least so far as their contents of certain substances are concerned. This Act is so far-reaching that it will not be possible at this time to venture a prediction as to final results.

"One of the most beneficial and immediate results of the enforcement of the Act will be a recrudescence of that commercial honesty and integrity which is so necessary to establish that perfect faith in all commercial transactions.

"As a natural sequence of this Act, there should be organized a National Department of Health.

"One of the fundamental principles of all civilized countries should be the preservation and care of the public health. . . . This association should re-emphasize its position, as being in favor of such a department, and should appoint a committee to join the American Medical Association, to aid in obtaining the necessary legislation. We should go still further and demand representation in this department, since ours is the first national association to concern itself about public health. Protest against the importance of adulterated drugs and medicine was the immediate cause for the organization of the American Pharmaceutical Association here in this city (New York) in 1851, and its investigation and reform was the most important work during the first decade of its existence.

"State Boards of Health, as at present constituted, do not, in

most States at least, present the ideal conditions that should prevail in bodies of this character. There should be at least one pharmacist, one dental and one veterinary surgeon on each and every one of these Boards. State institutions, such as our insane asylums, should have registered pharmacists in charge of their dispensaries. I recommend that proper steps be taken to obtain necessary legislation to bring about such improved conditions in States where such do not now exist."

A recommendation was made to refer the matter relating to the labeling of preparations under the Food and Drugs Act to "the Committee on Legislation, with instruction to try to obtain changes in the Act, so that when an article is labeled with a U.S.P. or N.F. title, it must comply with their standards of purity and strength. The present interpretation of this clause in the Act is clearly wrong and we should not permit it to stand."

The speaker's remarks on the sale of narcotic drugs and cocaine concluded as follows:

"A majority of the victims of drug habits may be laid at the door of a certain class of physicians. The laws, as they are now, only cover the retail drug trade; there is no restrictive legislation so far as the importer, manufacturer, jobber or physician is concerned, excepting that by special provision they are always exempted from such restriction. It is desirable to check the indiscriminate use of drugs of this class, and I would suggest that the Committee on Legislation and Education take this matter up for serious consideration and report as to best methods for obtaining the necessary legislation."

On the subject of board examinations President Eliel said:

"There are in the United States, approximately, taking population into consideration, eight pharmacies and drug stores to one in Continental European countries. Despite this fact, there are those who deprecate the commercialization of the drug business and the fact that in a majority of these stores the practice of pharmacy has become a secondary feature. This enormous overcrowding is due in part to laxity in our laws, not being strict enough in educational and other requirements, also in methods of examinations in vogue by most of the Boards of Pharmacy. Under present laws, in most States, examinations are limited to three days. This is entirely inadequate to determine what a candidate can 'do.' The ordinary

methods of examination fall short in determining a candidate's competency. Questions, even with ample time at the disposal of a Board, and the wide range from which they may be selected, are, after all, but a very imperfect test of real knowledge. The present system of examination, making 75 per cent. or more consist of written questions, is entirely wrong. A recent graduate, or one who has 'crammed' from one of the many 'quiz compends,' could pass such an examination, but what could he 'do?' This can not be determined in the short time allotted for such examination. Five days, at least, should be given for the examination and the practical demonstration of the candidates' ability. Of this at least 75 per cent. should consist of laboratory and prescription work. The laboratory work should consist of assay processes, the preparation and standardization of test solutions, also to the application of tests to determine the purity of the various articles submitted. The prescription work should be of a character to test the knowledge as well as the skill. This would make the grade of registered pharmacist much more difficult to reach, but if we ever expect to elevate the practice of pharmacy to a proper professional standard, we will have to proceed along these lines. If the pharmacist hopes to maintain his professional status—and we assume that this is his desire—he must put himself on a level with his co-laborer and ofttimes chief competitor, the physician; higher standards and more rigid examinations are required. I, therefore, urge that this association put itself on record at this time as being in favor of a higher educational standard and more rigid and extended examinations by the Boards of Pharmacy. Also that this association use its best efforts with the different State Legislatures to that effect."

In a series of recommendations which pertained mostly to the internal workings of the association, appeared the following: "I recommend that manufacturers of such articles as aqua ammoniæ, acetic, nitric and other acids, be urged to abandon their archaic methods of branding and to adopt modern methods for stating percentage contents. F., FF., FFF., FFFF., etc., may have conveyed a definite idea as to strength fifty years ago, but to-day are entirely without meaning. Branding by degrees Baumé is also unsatisfactory, as this requires conversion to ascertain the strength.

"We should offer due notice and after a specified time refuse to accept such goods unless properly labeled.

"A great source of annoyance and financial loss to the pharmacist is due to the multiplication of similar preparations by manufacturing houses under different titles; otherwise reputable houses should refrain from such practice.

"This association should enter protest against further abuse of this character."

On the question of revising the U. S. Pharmacopœia under the supervision of the National Government, the president expressed his views as follows:

"Foreign pharmacopœias so revised cannot be compared in any respect with the U.S.P. The conditions under which the U.S.P. is revised are the best for this country. The Government has now representation in the Pharmacopœial Convention through its various medical and drug departments, in its different branches of service. This might be enlarged upon by the Convention electing one of the Government delegates as a member of the Revision Committee. But it is clearly in the interest of all concerned to retain control of the Pharmacopœia under present conditions."

The address was referred to a committee composed of the following members: William H. Zottman, Vermont; Ralph B. Gable, New York; and Charles Holzhauer, New Jersey.

An epitome of the minutes of Council was read by the secretary, Henry M. Whelpley. Among other things noted were: The proposition to elect an honorary president; the election of 320 new members during the year; the increase of the number of members of Council to 28, 7 being added by the American Pharmaceutical Association branches, and the adoption of the report on the Ebert estate, which will add about $4,000 to the funds of the association.

The names of the committees having reports to make being called, Prof. Henry P. Hynson announced that Prof. C. Lewis Diehl had been taken ill in Philadelphia on his way to the meeting, and moved that the association send a telegram of sympathy to him, which motion was unanimously adopted.

The names of the members of the Nominating Committee having been reported, the first session adjourned.

SECOND GENERAL SESSION.

This session, held on Tuesday morning, was devoted to the reading of reports.

The report of the Nominating Committee was accepted and the following officers for the ensuing year were duly elected: President, William M. Searby, San Francisco; first vice-president, Oscar Oldberg, Chicago; second vice-president, H. H. Rusby, New York; third vice-president, O. W. Bethea, Meridian, Miss.; treasurer, S. A. D. Sheppard, Boston; general secretary, Charles Caspari, Jr., Baltimore; reporter on the Progress of Pharmacy, C. Lewis Diehl, Louisville; new members of Council: Leo Eliel, South Bend, Ind.; E. G. Eberle, Dallas, Tex.; and F. C. Godbold, New Orleans.

For honorary president the association unanimously elected P. C. Candidus, of Mobile.

The report of the treasurer, S. A. D. Sheppard, for the fiscal year, July 1, 1906, to July 1, 1907, showed that the receipts, not including money for funds, were $19,507.49, and the expenses, $14,661.69, the receipts thus exceeding the expenses by $4,845.80.

After presenting his report, Mr. Sheppard announced that he would retire from office next year, thus giving the Association a year to consider the question of his successor.

Secretary Caspari read a report covering the work of the Committee on Publication, which contained the statement that the unprecedented number of 24,000 copies of the National Formulary had been printed during the past year.

In his report as editor of the American Pharmaceutical Association Bulletin, C. S. N. Hallberg stated that 40,000 copies of the convention number of the Bulletin had been distributed.

Chairman A. B. Lyons, of the Committee on the United States Pharmacopœia, being absent, the report of the committee was read by E. Fullerton Cook, of Philadelphia.

A report which Prof. Joseph P. Remington had presented as chairman of the Revision Committee to the Board of Trustees of the United States Pharmacopœia, at a meeting held on the Friday previous, was also submitted at the suggestion of the latter body. In this report Professor Remington referred briefly to the discussion in one of the drug journals upon the subject of "Government Revision," and said that "while the replies which have been sent to the journal have not been sufficient to warrant the expression of a definite opinion, it would seem that a majority of the writers are not favorable to a change in the general plan."

In this connection he quoted from the address of the president

of the British Pharmaceutical Conference at the late annual meeting in Manchester, in which he said a tribute was paid to American pharmacy and the pharmacopœial plan approved.

The main part of the report was devoted to a consideration of the conditions and changes brought about by the passage of the Pure Food and Drugs Act, and the adoption of the Pharmacopœia as a legal standard.

In discussing future methods of revision, the speaker said that "the present method of revision by correspondence is cumbrous, and some better means of communication between the members must be devised." The advantages of the present plan were outlined as follows:

(1) The committee is representative of various sections of the country. (2) There has not been the slightest intimation from any quarter that the committee were influenced either directly or indirectly by pecuniary reward. . . . (3) A committee of revision constituted like the present one is much nearer and closer to sources of information, and the education, training and life-work of such a committee fit them especially for the work. If the present committee had been able to procure in 1902 and 1903 the information that was freely tendered by manufacturers and others in 1906, not only would there have been much time saved, but there would have been no necessity for sending out "Additions and Corrections." (4) It is significant that while some European nations are advocating a more popular and democratic method of revising their pharmacopœias, there is some talk in this country of changing the present method and placing the whole work in the hands of the Government.

In concluding his remarks on this subject, Professor Remington spoke as follows:

The manufacturers and pharmacists as a rule are satisfied with the latest issue of the Pharmacopœia. They have incurred great expense to comply with its standard, and rapid and continuous changes in the standards are ill-advised and have a tendency to disturb values and cause great losses. That the Pharmacopœia should be revised oftener than every ten years must be apparent to all, and this subject must claim the serious attention of the next Pharmacopœial Convention; but, on the other hand, a constant tinkering with the standards should be avoided. That the medical profession will take vastly more interest in the revision of the next Pharmacopœia can be safely predicted; that it will be necessary to both medicine and pharmacy to work harmoniously together is also a necessity, and that any defects in the present plan of revision can and will be remedied in the future, is the sincere belief of the chairman of the Committee of Revision.

Among the other reports presented were the following: Report of the Committee on National Formulary, C. Lewis Diehl, chairman,

read by Henry P. Hynson; the report of the Committee on the Status of the Military Pharmacist, George J. Seabury, chairman, read by the secretary; report of the Committee on Transportation, Charles Caspari, chairman; report of the Committee on Local Branches, C. S. N. Hallberg, chairman, read by Otto Claus; the report of the General Committee on Membership and Reception, William B. Day, Chairman, read by Secretary Caspari, contained a suggestion that the committee should consist of one member from each State.

The report of the historian, Edward Kremers, showed that considerable interest is being taken in the proposed pharmacy exhibit in the new National Museum at Washington, and that a large space will be allotted to it.

William M. Searby, chairman of the Committee on Weights and Measures, stated that there is not much interest in this subject at present.

The recommendation of the Committee on Time and Place of Meeting, made through its chairman, Francis G. Schachleiter, that Hot Springs be chosen as the next place of meeting, was approved.

A temporary report on the plans for the reorganization of the association was submitted by the chairman of the committee, C. S. N. Hallberg. (See page 472.)

THIRD GENERAL SESSION.

The final general session was held on Saturday morning. The minutes of the three previous meetings of the Council were read by Secretary Whelpley, following which was considerable discussion on the subject of the manner in which authors of text and other books should be allowed to use the matter contained in the National Formulary.

The Council proposed a method whereby the members of the association would have a chance to vote directly by mail for candidates for president and vice-president, and also that the reporter on the Progress of Pharmacy, the treasurer and the general secretary be elected annually by the Council.

Of the other items reported in the minutes of Council, the following are of general interest: The second week in September, 1908, was chosen as the time for the Hot Springs meeting; the total number of new members of the association elected during the year

was 350, making a total membership of 2,200; J. H. Beal and H. M. Whelpley were respectively chosen president and secretary of the Council for the ensuing year.

The Procter Monument Committee, through its chairman, Dr. John F. Hancock, of Baltimore, reported progress in the work. He said that the work would require time and the co-operation of all the various pharmaceutical bodies, and spoke of the educational influence on the younger element in pharmacy by keeping before them the work of such a man as Procter. In concluding his remarks, Dr. Hancock said we build monuments to our soldiers, to those who were prominent in war, and should also build monuments to those whose business it is to save the lives of the people. He then called upon the secretary of the committee, Henry Kraemer, of Philadelphia, who presented a formal report of the work. Professor Kraemer prefaced his remarks by the statement that the movement originated several years ago as the sequel of a suggestion made by their late fellow-member, Albert E. Ebert, and that the work had been carried on by the association. The report showed that about $3,500 has been collected by the committee, and contained the proposal to turn over the funds collected each year by the committee to the association at the time of the annual meeting. The request was also made to have the committee enlarged, and this was granted, upon motion of Dr. Hancock. A motion made by S. A. D. Sheppard to accept the funds from the committee each year and to instruct the Financial Committee as to their proper care, was adopted.

The report of the Committee on Reorganization was submitted by the chairman, and by vote of the association placed upon the records for action next year.

REPORT OF THE COMMITTEE ON REORGANIZATION.

The committee begs to submit the following draft of the changes and additions to the Constitution of the American Pharmaceutical Association.

CONSTITUTION.

Article I. No change.
Article II. No change.

THE COUNCIL.

Article III. There shall be an administrative body known as the Council of the American Pharmaceutical Association. It shall be composed of delegates representing local branches, the State Pharmaceutical Associations, and the several sections of this association, as hereinafter provided in the by-laws. It

shall represent the delegated power of the association. It shall elect the general officers of the association and a board of six trustees, and shall transact all the general business of the association of a public, professional, scientific, or of other character that is not otherwise provided for. The trustees shall be members of the Council without the right to vote.

Article IV. The officers of the association shall be an honorary president, a president, three vice-presidents, a general secretary, a treasurer, a reporter on the Progress of Pharmacy, and an editor and local secretary, all of whom shall be elected annually by the Council. They shall hold office until their successors are elected.

Article V. Board of Trustees. The Board of Trustees shall have charge of the property and of the financial affairs of the association. Two trustees shall be elected annually by the Council, each to serve a period of three years. The president shall be a member of the Board of Trustees, and the general secretary and treasurer shall be members of the Board of Trustees without the right to vote.

Article IV. Change to Article VI.

Article V. Change to Article VII.

The Committee on Reorganization: M. I. Wilbert, C. S. N. Hallberg, Caswell A. Mayo, Eugene G. Eberle and Edward Kremers.

Reports were also received from the Committee on Publicity, E. H. Gane, chairman; and the Committee on Public Press, Francis B. Hays, chairman.

The report of the Committee on Ebert Memorial, W. M. Searby, chairman, was referred to the Council.

A resolution proposed by Thomas D. McElhenie, of Brooklyn, to the effect that it is the sense of the association that medical schools should teach and make more use of the U. S. Pharmacopœia, either as a text-book or reference book, was adopted.

After the installation of the new officers, President William M. Searby appointed delegates to the annual meetings of the N. A. R. D. and the N. W. D. A., and a rising vote of thanks was extended to the Local Entertainment Committee, with special mention of the arduous labors of Thomas P. Cook, as chairman, and also to the pharmacists of New York and their ladies, and the German Apothecaries' Society.

Some other matters were also considered, after which the meeting was declared adjourned.

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

H. A. B. Dunning, chairman; Joseph Weinstein, secretary; Franklin M. Apple, associate.

This Section held two sessions, one Tuesday afternoon and one Tuesday evening. No less than twenty-seven papers were on the

programme, and these for the most part were of a fair order of merit.

Chairman Dunning's address was highly creditable, and showed above all else that the most capable pharmacist is the one who appreciates the value of scientific knowledge and its application to his art. That Mr. Dunning holds to the same view was shown in the opening paragraph of his address, where he expressed the view that the work of the Scientific Section might with advantage be more closely co-ordinated with that of the other sections, and thus questions arising in practice could be studied by those more especially qualified for scientific work. He said that interesting problems were constantly coming forward in the practice of pharmacy, and suggested that these be investigated according to pharmaceutical methods, and then in case they proved difficult of solution, handed over to the scientific section, together with the results previously obtained. Among the examples given of such problems were the following: The question as to why equal weights of different chemicals increase volume unequally when dissolved in water; one as to why boric acid can be satisfactorily titrated in the presence of glycerin; the solvent action of certain chemicals upon other chemicals, and the liquefaction of certain substances in the presence of others, and still others of a more practical character.

The following papers were read:

A Few Points on Toxicology for the Practical Pharmacist.
By Joseph Weinstein.

The author advocated that the pharmacist should be trained, as in European colleges, to give first aid to the injured. With reference to poisons, he said that in order to give first aid it is not always necessary to know the specific poison; that poisons belong to two classes, sedative and stimulant, the symptoms and treatment varying according to these two classes.

Sodium Oleate: Some Commercial Preparations Containing it.
By M. I. Wilbert.

Liquid Soap: an Economical Formula.
By M. I. Wilbert.

The writer pointed out the advantages of the liquid form of soap over the cake form, but said that the cost of the ethyl alcohol

required in its manufacture is the chief objection to its use. In carrying on experiments to minimize the quantity of ethyl alcohol, the author found that a mixture of soda and potash soaps is much more soluble in water and more stable when diluted than either one alone. The following formula and directions were given:

Sodium hydrate, 40 grammes; potassium hydrate, 40 grammes; cotton-seed oil, 500 c.c.; alcohol, 250 c.c.; and distilled water, a sufficient quantity to make 2,500 c.c.

"In a suitable container, preferably a glass-stoppered bottle, dissolve the potassium hydrate and the sodium hydrate in 250 c.c. of distilled water, add the alcohol, and then add the cotton-seed oil in three or four portions, shaking vigorously after each addition. Continue to agitate the mixture occasionally, until saponification has been completed. Then add the remaining portion of distilled water and mix."

The Eyes and Hands in Dispensing: Technique.
By Henry P. Hynson.

The speaker stated that many students were not only unable to use their hands dexterously, but were unable to differentiate closely with their eyes, as in distinguishing a clear solution from a cloudy one, and differences in the size and color of objects. He said that much could be done by training along these lines to increase the skill of the dispenser.

Solid Opodeldoc and Other Official Preparations.
By H. A. B. Dunning.

Having his attention called to the fact that the linimentum saponato-camphoratum, or solid opodeldoc of the National Formulary, is an opaque preparation, and does not distribute as readily when applied to the skin as Squier's opodeldoc, the author carried on a series of experiments with the object of obtaining a product with these qualities, and evolved the following formula and directions:

Sodium carbonate, monohydrated, ·5; stearic acid, 2·5; water, 5·0; alcohol, 50·0; camphor, 1·25; oil of thyme, ·15; oil of rosemary, ·3; and stronger ammonia water, 2·5.

Dissolve sodium carbonate in the water by heat, add 10 c.c. alco-

hol and the stearic acid, warm until effervescence has ceased and perfect solution is effected, add balance of alcohol, and when not too warm, the oils and ammonia water, filter into bottles, closely stopper and set aside to cool.

A number of notes on official preparations were also submitted.

Hints on the Compounding of Glycerin, Benzoin and Rose Water.

By F. M. Apple.

The author advised against the extemporaneous preparation of this mixture, and gave the following formula:

Tincture of benzoin, f℥iij; glycerin, f℥viij; and rose water sufficient to make Oj.

Add the tincture of benzoin to four fluidounces of the glycerin, agitating the mixture thoroughly after each addition. Then add sufficient rose water, in small quantities and with thorough agitation, to make eight fluidounces. Strain the mixture through a straining cloth having a very fine mesh, rubbing the magma through the strainer with a glass rod or bone spatula. Repeat the straining three or four times. Allow the mixture to stand for several hours, and then add first the remainder of the glycerin and afterward the required amount of rose water, with agitation, after which allow it to stand, when it clears up.

Card-Indexing System for Prescriptions.

By Jacob Diner.

The author recommended that the compounder of a prescription be required to place the original recipe with the face down, and to copy on a suitable card, from memory, the articles he used in filling it. This is then checked with the assistance of another clerk, and properly numbered and filed, repetitions being filled from the card, and noted each time on the card. Several practical advantages were claimed for the method.

A Few Meritorious External Antiseptic Preparations.

By J. T. Harbold.

Formulæ were given for the preparation of an antiseptic glove lubricant, antiseptic flexible collodion, and a hand and toilet lotion.

Practical Experience in Dispensing.

By Leon Lascoff.

The author considered some of the causes which affect the character of identical prescriptions, when a different order is followed in adding the ingredients, or by other changes in the method of compounding.

The two following papers were read in the absence of the author by Caswell A. Mayo:

The Duplicate Prescription Blank.

By J. B. Moore.

The author advised that the pharmacists furnish physicians with prescription tablets with carbon paper, and presented a form of letter suitable to accompany the same.

The Dose Dial.

By J. B. Moore.

The author said that the dose dial constitutes an inexpensive little gift, which would be appreciated by the pharmacist's patrons.

Counter Prescribing and Dispensing.

By F. M. Apple.

The author thought that such simple remedies as paregoric, castor oil, essence of Jamaica ginger and like preparations could be dispensed by the pharmacist, if properly labeled, but disapproved the practice of selling non-secret remedies for various diseases.

Milk of Magnesia.

By Otto Raubenheimer.

The author suggested that the 250 grammes of magnesium sulphate directed in the formula of the National Formulary be reduced to 240 grammes.

Citro-compounds of Iron.

By A. B. Stevens.

The author criticised the formulas given in the National Formulary for these preparations, and expressed the opinion that instead of

the iodine and chlorine being combined as citro-salts, double salts are formed, one of which is a haloid salt and the other the citrate of iron.

The chairman remarked that this paper involved a theoretical problem, the investigation of which should be continued in the Scientific Section.

Tincture of Iodine.

By Charles H. LaWall.

The author carried on a series of experiments to determine the keeping qualities of this tincture under varying conditions. He found that a tincture of alcohol and iodine deteriorates rapidly either in light or darkness; that the tincture made according to the official method keeps well under nearly all conditions, and that when sodium chloride was used to prevent the loss of free iodine instead of potassium iodide, the preparation was not quite as stable as when made according to the official process.

Quality in Dispensing.

By Wilbur L. Scoville.

After stating that there is "a new atmosphere in pharmacy and a new outlook," the author said that physicians are becoming acquainted with the legal medical standards, and that this acquaintance "must be ripened into friendship." One of the ways to accomplish this is by strict attention to quality. Then, too, it must be remembered that the semi-secret remedies which the National Formulary was designed to replace owed their popularity and also their success to their artistic qualities—those qualities that appeal to the eye and the palate. In conclusion, the author said: "Physicians are ready to take up National Formulary and U. S. Pharmacopœial preparations, but they must not be disappointed in them. They have been educated to scepticism regarding the pharmacist's ability to satisfy them, but pharmacists can and must prove their ability to please. The times demand artistic as well as therapeutic results. The preparations that win must show both. Only such will hold their own. And if physicians find both results in the preparations that they shall try from their druggists, they will stick to them."

THE MODERN PHARMACY.
By B. Sacks.

The author deplored the bizarre character of many modern pharmacies and advised that the pharmacist give his undivided attention to his professional work.

Several other papers were received, some of which were read by title:

"Some Interesting Prescription Incompatibilities," by W. J. Robinson; "Cataplasma Kaolini," by H. C. Blair; "The Future Pharmacist," by B. Romansky; "Cutting Compounding Corners, or Pharmaceutical Economies," by Frank E. Fisk; "His Terrible Mistake in Dispensing," by L. Marmor; "Twelve Prescriptions," by H. A. B. Dunning; "Glycerin *vs.* Sugar," by William C. Kirchgessner; "Heat and Its Utility at the Compounding and Dispensing Counters," by Frank E. Fisk; "Clean Them Yourself," by William F. Kaemmerer; "Practical Thoughts and Suggestions," by Louis Schulze; "A New and Continuous Lime Water Apparatus," by Otto Raubenheimer; "Elixir Curaçoa," by H. C. Blair.

The following officers were elected: chairman, Franklin M. Apple; secretary, Joseph Weinstein; associates, Wilbur L. Scoville and E. Fullerton Cook.

SECTION ON EDUCATION AND LEGISLATION.

Oscar Oldberg, chairman; Joseph W. England, secretary; associates: David F. Jones, Harry B. Mason and Wm. K. Ilhardt.

This section held two sessions, beginning Wednesday morning. Chairman Oldberg's address last year, and the one presented by him this year, will find a permanent place in the history of pharmaceutical education in this country. The former was published in this JOURNAL and the second will also be published in full in its columns. The address was referred to a committee composed as follows: Henry P. Hynson, Wm. M. Searby and C. S. N. Hallberg.

In Secretary England's report comprehensive statistical data pertaining to schools and colleges of pharmacy were presented, giving the entrance requirements, attendance, number of graduates, weeks of instruction, and hours of obligatory lecture and laboratory work. The report also included the results of the work of the State boards of pharmacy, regarding applications, registrations, examinations, etc., and in addition information relating to new legislation in the

different States and territories, as obtained from the different State and territorial associations.

Dr. J. N. McCormack, a delegate from the American Medical Association, addressed the Section on "What Should be the Relation of Physicians and Pharmacists?" Dr. McCormack had been invited to make this address, in consequence of certain statements contained in a report which he presented as chairman of its Committee on Organization at the recent meeting of the American Medical Association (see this JOURNAL, July, 1907, p. 331).

In beginning the discussion, Dr. McCormack spoke of his long connection with legislative work in his own State, and of the opportunities which he had had to study the relations and feelings of physicians and pharmacists, not only in this country, but abroad. He then quoted from that part of the Atlantic City report which contained the statement that, at the State capitals visited by him, he found expert lobbyists of the National Association of Retail Druggists working against pure food and drug legislation. He said, however, that this accusation was not intended to apply to all pharmacists, and that he also held a large element of his own press and people responsible for many of the abuses of this class.

Dr. McCormack then referred to the indiscriminate selling of habit-producing drugs and nostrums, and said that, aside from the victims of this practice, the three factors essential to its continued existence are the proprietor or manufacturer, the public and religious press as advertising mediums, and the drug trade; and that without the complicity of these three agencies this business could not thrive for six months. He said that of these three, druggists profit least by the nostrum business. But he said it was his purpose to consider the moral phase of the question, and that, profit or no profit, druggists cannot afford longer to be a party to the practice, or to oppose legislation intended to lessen this evil.

Some of the grave and harmful effects of counter-prescribing were pointed out, after which the subject of dispensing by physicians was considered. This latter practice was attributed in part to "the gradual drifting apart and coincident misunderstanding of the two vocations," but mostly to the imperfect manner in which pharmacology and therapeutics have been taught in the medical schools. The speaker added that "with the proper conception of duty, the time has come when no physician can afford to prescribe and no

pharmacist can afford to dispense any preparation of which he does not know the composition and purity. This he said meant getting back to the Pharmacopœia and National Formulary, although it did not interfere with the use of substances of known composition and value, but that it would put an end to all secret remedies.

Dr. McCormack said that instruction of this kind is not only being urged upon the medical schools, for the benefit of the future physician, but that it is being made a permanent feature of the post-graduate courses.

The speaker then said that not only is the work of reform in these matters in its infancy, but that the results in some directions must be long delayed and imperfect without the earnest co-operation of the rank and file of druggists. He further said: "I believe that there should be such an effective alliance, offensive and defensive, between this organization and the American Medical Association as will insure only pure drugs for the sick people of this country. This would require joint action, through committees and otherwise, in framing, passing and enforcing the necessary legislation, and in what is even more important as a necessary premise for all this—such a campaign of education, systematically conducted over the entire country, as will give the professional and public sentiment, without which all such legislation is almost worse than useless."

Dr. H. H. Rusby briefly discussed the question—"What are the best means which the pharmacists may adopt to render their services most valuable to the medical profession and the public, and to command their confidence and appreciation?" speaking as follows: When physicians give evidence of their ability to diagnose correctly and cease from dispensing, then will pharmacists respect them. When pharmacists refrain from prescribing and give evidence of competency, then will physicians respect them. The remedy does not lie in criticising the other profession, but in each disciplining the members of its own profession. If pharmacists improve themselves physicians will know it, and vice versa.

The question—Is pharmacy a profession? has been answered in the affirmative.

Of the methods adopted to secure pure drugs, none are so effective as those originated by the American Pharmaceutical Association. On the other hand, no one could ask more effective methods for eliminating quackery than those adopted by the American Medical Association.

The present is witnessing an educational renaissance in pharmacy, and this is helping to stimulate the activity on the part of the medical profession, which fact was acknowledged and confirmed by Dr. Cohen. It is the duty of every one to familiarize himself with present conditions for reform and to find some place in which to work, both women and men.

These two addresses were discussed as follows:

Jacob Diner refuted the statement made by Dr. McCormack that the National Association of Retail Druggists maintained an expensive lobby to promote nostrum interests; he said that as a past officer of the association he had no knowledge of such a lobby. He said that sometimes the members of the N. A. R. D. found themselves on an opposite side from the medical profession in State legislation. He said the druggists are not interested in legislation merely to protect their pockets, but to protect their profession, and cited as an example of adverse legislation the law proposed in New York to the effect that no drugs should be sold by druggists except on physicians' prescriptions. On the other hand, he said the members had supported anti-narcotic legislation, and he maintained the honor and principle of the druggists of the United States.

Professor Hallberg said that the members of the Section should not discuss past matters on account of loss of valuable time. He claimed that it was necessary for Dr. McCormack to repeat the statement which he made as a matter of history, as it was by virtue of it that he had been invited to speak to the association. He said that we should cut loose from the moorings of the past, and pointed out that the whole medical profession seems to be a subject for the caricaturist as a result of such discussions.

Dr. William Muir, of New York, said that, from his experience in legislative work, he agreed with Mr. Diner; that he had approached the medical men of the State Legislative Committee of New York, and that they appeared not to be willing mutually to consider the form of legislation, but rather to desire to dominate the proceedings.

He also took exception to the statistics quoted by Dr. McCormack, showing that the majority of the habitues of narcotic drugs in insane asylums owe their condition to the unscrupulous selling of these drugs by pharmacists; he said that his own investigations showed that the free use of hypodermics by physicians is largely responsible for the number of these victims.

Dr. Muir concluded his remarks by saying that experienced men should be on the legislative committees; that the members of boards of pharmacy are the most competent to look after the question of pure drugs.

Henry P. Hynson said that Dr. McCormack had presented his case as fairly as it could possibly be done, and with but one object, namely, to benefit suffering humanity and to elevate the profession of pharmacy.

W. M. Searby, of San Francisco, said that in his own city the physicians who write any considerable number of prescriptions get a percentage on them, and that druggists who refuse to comply with this demand will not be able to succeed. This, however, Professor Searby said is a side issue, and insisted that druggists should maintain their dignity and receive recognition as equals, since they are also endeavoring to improve standards of education and to promote the propaganda for reform.

C. B. Lowe, of Philadelphia, contended that professors of materia medica should teach the physiologic action of drugs.

W. C. Anderson, commenting on the proposed New York pharmacy law, said that it would have permitted druggists to sell preparations of any percentage strength providing they were so labeled. He said that the U.S.P. standards should be upheld.

Professor Anderson thought that the main bone of contention is the selling of nostrums by pharmacists; but he said, when the law went into effect requiring manufacturers of narcotic preparations to label them, many druggists threw them out. He then declared that if physicians will tell druggists which patent medicines to throw out they will do so; but he said no pharmacy is complete without them.

Professor Hallberg said that some years ago he attended a public lecture by Dr. McCormack, in the course of which the speaker advised the audience that whenever they saw a pharmacy with signs of cut rates displayed, they should pass it by.

In replying to the several speakers, Dr. McCormack said that whatever the two professions have been doing in the past, they should do differently in the future.

He admitted that he was glad to be corrected on the lobby statement; that this knowledge would enable him to face those making false claims before legislative committees. He then pleaded that the State committees of the two associations come together and

discuss the various subjects brought up fairly and calmly; and that these latter bodies join hands with the Council on Chemistry and Pharmacy of the A.M.A., which he said belongs as much to one profession as the other. He thought that joint committees might devise harmless home remedies which could be sold by druggists without interfering with ethical canons.

Again he urged that the two professions join hands and said, quoting the words of our great commander, "Let us have peace."

Robert A. Hatcher said he thought the American Pharmaceutical Association, with its 2,000 members, should embrace the opportunity offered to join hands with 70,000 medical men, and offered the following resolution, which was adopted:

Resolved, That this Section request the American Pharmaceutical Association to direct the Committee on Legislation to co-operate with the State legislative committees of the American Medical Association in the furtherance of such legislation as is designed for the mutual benefit of the two professions and the community at large.

A recommendation by L. E. Sayre that the State pharmaceutical associations be informed of this action and asked to adopt similar resolutions, was approved.

President Eliel said that he saw the dawning of the light in the east, and that he was thankful to witness these signs of better relations between physicians and pharmacists.

Professor Hallberg read a resolution along similar lines, which had been adopted by the Section on Pharmacology at the recent meeting of the A.M.A.

On convening in the afternoon, the Section took up the discussion of the subjects involved in the following query and resolution:

What effective action can the American Pharmaceutical Association take to prevent the discredit cast upon our calling by pharmacy laws which in specific terms authorize the Boards of Pharmacy to license minors and persons without any prescribed educational qualifications to open or conduct drug stores on their own responsibility, to have charge of the dispensing of medicines, and to sell opium, morphine, cocaine and other habit-producing drugs?

Resolved, That it is the sense of the Section on Education and Legislation of the American Pharmaceutical Association that pharmacy laws which are so worded that they permit or can be construed

to permit the issuing of licenses to minors and persons without definitely prescribed educational qualifications to open or conduct drug stores, to have charge of the dispensing of medicines, and to sell habit-producing drugs, cast unmerited reproach upon our occupation and should be amended.

This resolution was adopted.

Jacob Diner considered the two following queries:

Are the conditions in the drug stores of to-day such as to warrant the assumption that those admitted to apprenticeship can there acquire the education requisite to make them competent pharmacists?

What instruction do the apprentices and clerks receive in the average drug store?

Mr. Diner said that in the olden time the apprentice was required to have a common school education, and was taken into training by the pharmacist to whom he was bound. Now, Mr. Diner said, no questions are asked as to the apprentice's education and no training is given by the proprietor. He claimed that a professional pharmacist cannot be built up without a good foundation.

Otto A. Wall, of St. Louis, read a paper entitled, "Why We Should Not Demand a High-School Education as a Prerequisite."

The writer pointed out a number of the defects of our educational system, and substantiated his claims by numerous quotations from prominent educators. He said that we should begin to improve this system from the foundation upward and not from the top downward. He then cited statistics to show that only a very small percentage of the pupils, even in the large cities, pass the high school, and that improvements should be made in the grammar schools so as to fit the pupils to engage in the general pursuits of life. He thought that in the common schools the useful should be kept more prominently in mind and that in the graded schools less attention should be paid to those studies required for entrance to the universities.

The author furthermore claimed that the universities are monopolistic in their tendencies; that they demand such large sums from the public funds that there is not sufficient for general educational purposes.

He placed colleges of pharmacy, manual training schools and other technical schools on the same plane, and said that whatever

preliminary education is necessary for the students of these schools, the institutions must teach themselves.

Dr. H. L. Taylor, of the Department of Education of New York, was also asked to address the Section. Dr. Taylor took issue with Dr. Wall and said that the object of education is not utilitarian, but ideal; that in the United States more money is being given for the training of children than in any other country. He then asserted that utilitarianism is not the test of education, and said endeavors are being made to give a uniform education to every boy and girl in the United States. He said that one of the earlier efforts was to establish free schools, and then to establish free high schools.

Then referring to the colleges and schools of pharmacy, he said the question is narrowed to this: They are to be reduced to trade schools, and the students of pharmacy shall be satisfied with an education which can be obtained at fourteen years of age. They must, however, wait until they are twenty-one years old before they can graduate from a college of pharmacy.

In closing, Dr. Taylor assumed that the association would not approve of this plan.

Professor Hallberg agreed with Dr. Wall, and criticised severely the instruction given in the public schools. He said that a grammar school graduate ought to be able to take up the special studies taught by colleges of pharmacy.

Attention was then given to the following query:

The apprenticeship system has ceased to exist in nearly all occupations in which it formerly constituted the chief or only method of training by which trades and professions could be mastered, and professional, technical and trade schools have taken its place. It is generally recognized that this change is an advance, and that greatly increased efficiency may be attained through the special schools referred to. Is this true also in regard to training for pharmacy?

Gustave Wolff, of New York, contributed a paper on this subject, in which he advocated a return to the old apprenticeship system, which was a clerkship of ten years.

Clement B. Lowe, of Philadelphia, followed with a paper on "Pharmaceutical Experience as a Prerequisite to Pharmaceutical Education and Examination."

H. L. Taylor, secretary of the Syllabus Committee, presented a list of definitions of pharmaceutical terms.

The query—What are the best methods of teaching students of pharmacy in each of the principal branches included in the curricula of the pharmaceutical schools?—was considered by C. S. N. Hallberg, who said that, owing to certain inconveniences in presenting lectures, he had devised a note-book with a syllabus on one page and a blank page opposite. The student is asked to review the subject in the text-book and then to write a thesis on it on the blank page.

The following members were elected officers for the ensuing year: Chairman, Joseph W. England, Philadelphia; secretary, Charles H. LaWall, Philadelphia; associates, L. E. Sayre, Lawrence, Kan.; Wilbur L. Scoville, Boston; F. A. Hubbard, Boston; F. A. Sala, Winchester, Ind.

SCIENTIFIC SECTION.

Reid Hunt, chairman; Virgil Coblentz, secretary; Charles E. Vanderkleed, associate.

This Section held two sessions beginning Thursday morning. Mr. Vanderkleed explained, in calling the first session to order, that owing to the absence of both Dr. Hunt and Professor Coblentz the past summer, much of the work of the Section had fallen to him. He also stated that owing to the fact that Dr. Hunt had to prepare several papers for the International Congresses, which he was attending in Europe, he had been unable to finish his address as chairman of the Section.

The Committee on Ebert Prize, through Charles E. Caspari, of St. Louis, chairman, recommended that the prize be awarded to Frederick B. Power and Frank Tutin for their paper on "Chemical Examination of Eriodictyon."

The report of the Committee on Drug Adulterations was read by Eustace H. Gane, of New York, who stated that the past year had seen marked improvements in the drug market. Several quotations were read relating to cases where some variations in quality were found, and the opinion expressed that the persons involved should not be held as adulterators for such deficiencies. Mr. Gane said that inasmuch as the assay processes do not always yield concordant results, and also in view of the fact that some of the official methods have been adversely criticised, Boards of Health should be very lenient in considering cases of this kind.

Considerable variation in vegetable drugs, due to variation in

percentage of moisture, as also considerable variation in the amount of extract, was reported.

It was, however, found that no class of substances is more adulterated than the essential oils, and that the mixtures sold for essential oils conform more closely to the U.S.P. standards than the natural oils.

The report was supplemented by Dr. H. H. Rusby, who presented the following: The extract of glycyrrhiza is required by the U. S. Pharmacopœia to contain not less than 60 per cent. of soluble matter, whereas if properly made it yields 95 per cent. of soluble matter. Manufacturers thus have an opportunity of adding other materials, and inasmuch as these are sometimes deleterious in character, the Pharmacopœia should specify what these added substances should be.

During the whole month of August only six articles were condemned in the appraiser's office in New York. The drugs were not only up to standard, but of fine quality. Last year it was claimed that certain imported drugs could not be obtained of good quality, and the U.S.P. Revision Committee were requested to reduce the standards. The members, however, took the stand that if the standards were maintained, better drugs would be sent to this country, and as a result there has been a steady improvement in quality. Some spurious drugs are still coming in, and this is due to the fact that the appraisers are not yet able to distinguish the genuine from the spurious drugs. These include strophanthus, jaborandi leaves, quebracho. Japanese aconite is imported for manufacturing purposes and must be so labeled. Bombay mace, while worthless as a spice, could be imported for other purposes if properly labeled.

Lyman F. Kebler said that to his mind the term powdered asafetida is a misnomer, as asafetida cannot be powdered unless it is admixed with some other substance, and he claimed that the diluent should be stated. Referring to a report by Dr. A. R. L. Dohme that a sample of asafetida which he examined yielded 60 per cent. of ash, Dr. Kebler said that while the port of New York is closed to inferior products, the same supervision does not yet apply to the other ports. He also stated that wood alcohol preparations are being imported into this country for veterinary purposes, and that investigation showed that they are also being used in the treatment

of human beings. The following is an example of the method of labeling these preparations: "tincture cinchona meth."

He then spoke of the importance of the interstate commerce regulations, and said that a manufacturer in Pennsylvania who uses wood alcohol in the manufacture of preparations to be sold in his own State does not use it in the products sent to other States. Attention was also directed to the fact that sweepings are imported into this country and admixed with the genuine drugs, or they are sometimes powdered and sent out to the trade.

Prof. John Uri Lloyd said that the valley of the Menander River furnishes the licorice used in the manufacture of tobacco. He said that wherever there is a wheat field or vineyard, there the licorice plant is found. It is so abundant as to be regarded as a weed and cannot be eradicated. The extract of licorice made in that region supplies the European market, but none of it is sent to this country on account of the import duty. He said that the method of manufacture of the extract is rather primitive, but that the product is pure, as there is nothing cheaper than licorice itself.

Following are abstracts and extracts of the papers presented to the section:

Chemical Examination of Grindelia. Part II.

By Frederick B. Power and Frank Tutin.

(Read by Virgil Coblentz.)

This is a continuation of the work reported by the authors at the meeting of the association in 1905. The drug used was probably *Grindelia camporum*, Greene. In the previous paper the authors reported the isolation of the hydrocarbon hentriacontane, $C_{31}H_{64}$, a new phytosterol (m. p. 166° C.), l-glucose, tannin, amorphous coloring matter, formic acid and an essential oil. The chief constituents are amorphous resins, which have now been further examined. These resins, which are soluble in petroleum, consist to a large extent of a complex mixture of liquid acids. These acids are for the most part optically active, unsaturated cyclic compounds. Some of them are oxy-acids and appear to contain benzene nuclei. A very small amount of cerotic acid and apparently a trace of palmitic acid are also present. Another hydrocarbon has also been isolated, which consists for the most part of a complex mixture of esters, presumably glycerides.

The ether extract of the resins consists, to a very large extent, of a mixture of amorphous products and very small amounts of a colorless crystalline alcohol and a yellow substance of phenolic nature. The alcoholic body possesses either the formula $C_{17}H_{28}O_3$ or $C_{23}H_{38}O_4$. It crystallizes in plates, melting at 256–257° C., and yields an acetyl derivative melting at 161° C. The yellow phenolic substance crystallizes in prisms, melting at 227–228° C., and possesses the formula $C_{14}H_{12}O_5$. It gives an acetyl derivative melting at 154° C.

Aspidium Marginale and Osmunda Claytoniana.

By Henry Kraemer.

The rhizomes of a number of ferns have been used in medicine since ancient times. Of these, that of *Aspidium Filix mas* is probably the most valuable and is official in most of the pharmacopœias. It is, however, only a little more than thirty years since the rhizome of the closely related American species, *Aspidium marginale*, was first subjected to analysis. The rhizome was subsequently examined by Cressler and Kennedy, and recommended by Maisch for introduction into the United States Pharmacopœia, becoming official in the 1880 edition. The rhizome, having been found to have properties similar to that of *Aspidium Filix mas*, was probably introduced with a view of encouraging the collection of the American drug, and probably also with a view of obtaining the drug in a fresh condition.

While the crude drug dealers mostly list only the foreign drug, and the filicic acid on the market is said to be derived from *Aspidium Filix mas* growing in Europe, there are indications that attempts are made to collect the drug in this country. The collectors, however, do not always seem to be able to distinguish *Aspidium marginale* from others of our native ferns, and in several recent instances the drug purchased for Aspidium has proved to be the rhizome of *Osmunda Claytoniana*, a plant belonging to a different family of ferns.

It was pointed out that there is no difficulty in distinguishing these two ferns. The plants belong to distinct families of the fern group. *Aspidium marginale* is characterized by the fact that there is no distinction of fertile and sterile fronds and by the fact that the sori have a covering known as the indusium. On the other hand, *Osmunda Claytoniana* belongs to a family distinguished by the fact that there are two kinds of fronds, fertile and sterile, which are very distinct in character.

The rhizomes and stipes of these two plants are also very distinct in character. In *Aspidium marginale* the stipes are especially characterized by the presence of chaff. The special characters of the stipes of *Osmunda Claytoniana* are the large central fibrovascular bundle, which is involute, and the absence of internal glandular hairs.

A Study of the Alkaloids Gelsemine and Gelseminine.

By L. E. Sayre.

The author said: "The results of this study have emphasized the fact that the so-called gelsemic acid, contrary to statements of early investigators, is only scantily precipitated by lead acetate and subacetate. This æsculin-like principle is so persistent that the residual solution, after lead precipitation, contains a measurable quantity of the principle. The results have, in addition, shown that the same results as Thompson obtained (by the use of lime in removing the plant acids) cannot be obtained by the use of lead. That is, the gelsemine chloride, in colorless crystalline form, is not obtainable by the lead process. It is to be noted, however, that the fresh drug was employed in the present study. I hesitate to suggest that gelsemine, as described by Thompson, may be absent in the fresh root. It will require further study to remove the doubt that this distinct principle exists only in the dry root. The existence of two alkaloids in gelsemium, having the properties described by Thompson and others, not having been fully accepted by some authorities, is worthy of further study."

Assay of Preparations of Gelsemium.

By L. E. Sayre.

The author applies the general method of assay recommended by Webster (see this Journal, 1907, pp. 301–307.)

The Estimation of Cantharidin in Cantharides and Preparations.

By Frank R. Eldred and W. C. Bartholomew.

The method given is as follows: Place 10 grammes of cantharides in No. 60 powder, in a small percolator provided with a stopcock; add a mixture of 25 c.c. of chloroform and 2 c.c. of glacial acetic acid and allow to macerate for one hour. Then drain the percolator, pack

the drug firmly and exhaust by slow percolation with chloroform, receiving the percolate in a Gordin's distilling flask. Distil off most of the chloroform by means of a water bath, and blow air through the flask to remove the last traces. Add 10 c.c. of liquid petrolatum and 150 c.c. of hot water to the residue in the distilling flask. Heat nearly to the boiling point on a water bath, and agitate several times while keeping at this temperature. Draw off the aqueous solution through a small filter into a separatory funnel. Repeat this operation with three more portions of 75 c.c., 50 c.c., and 25 c.c. of water. Cool the mixed aqueous liquids, add a little hydrochloric acid and extract by shaking with four portions of chloroform. Evaporate the chloroform solution in a tared flask or beaker on a water bath. The solution must be removed from the water bath while some chloroform remains, and the evaporation completed in a current of air, as decrepitation occurs when the cantharidin begins to crystallize. The cantharidin is then purified in the manner described by Self and Greenish, as follows: Wash the crystals with three portions of 2·5 c.c., 2·5 c.c. and 1 c.c. of a mixture of equal parts of absolute alcohol and petroleum ether saturated with cantharidin, pouring the washings through a small filter. Then wash the crystals and filter with petroleum ether until the filtrate leaves no appreciable residue on evaporation. Wash the filter with a little chloroform, receiving the filtrate in the vessel containing the greater portion of the cantharidin. Evaporate the chloroform in a current of air and dry at ordinary room temperature in a vacuum desiccator until of constant weight.

The Estimation of Iron in Scale Salts.

By Frank R. Eldred and C. M. Pence.

The authors found that the results obtained by the iodometric method were all lower than the gravimetric results, and that this was due to the presence of ferrous iron. In order to oxidize all of the iron to the ferric condition, they found that the citric or tartaric acid present must be completely oxidized. The only practical method of oxidation found was by means of concentrated sulphuric acid. The scale salt (0·5 gramme) was placed in a 500 c.c. Kjeldahl flask, 20 c.c. of concentrated sulphuric acid and 10 grammes of potassium sulphate were added, and the flask heated until only a pale yellow color remained. The contents of the flask

were then dissolved by heating with about 200 c.c. of water, and the solution cooled and titrated.

All methods which depend upon the reduction of ferric iron give low results when applied to scale salts; moreover, if heat is used in dissolving the salt, a further reduction of iron will take place, especially with the tartrates, where concordant results cannot be obtained unless the conditions under which the salt is dissolved are always the same.

In order to determine the total iron in scale salts it is necessary to employ a gravimetric method, or to completely oxidize the organic acid and ferrous iron before titration.

Organotherapeutic Products, with Special Reference to the Standardization of Thyroid Preparations.

By F. C. Koch.

The author concludes that there are no chemical or physiological quantitative methods for testing thyroids. Of Hunt's physiological method, he says: "It is by far more delicate than any chemical means we know of, but so far it has not been perfected as a quantitative method. Thus, Hunt finds that the susceptibility of mice depends largely upon their age, weight and the nature of their food, also that 0·3 gramme U.S.P. desiccated thyroids fed for twelve days did not seem to have a proportionately different effect from feeding 0·1 gramme for ten or eleven days, or 0·05 gramme for fourteen days. Let us hope that Hunt's very delicate method can be devised to be of value in a quantitative way."

The U.S.P. Methods for Assaying Pepsin and Pancreatin.

By F. C. Koch.

The author commented on these methods as follows: The directions are deficient as to important details. In assaying pepsin, unnecessary delay after boiling the eggs and passing the albumen through the sieve must be avoided. Disintegration with acid water must be thorough, shaking by rotation being more satisfactory than by inverting. The final method of reading is very unsatisfactory. The peptonizing test for pancreatin is entirely unsatisfactory. As the test now stands, a weak or strong pancreatin can be considered official, depending upon the amount of nitric acid used. In the diastasic assay the kind of starch to be employed should be speci-

fied, the starch paste being best made in a beaker and cooled and used at once.

Dr. John M. Francis, of Detroit, said that he had previously stated that any pancreatin could be made to appear good or vice versa by the U.S.P. method. He said that milk is a very variable article, and that the peptonizing test should be dropped. He claimed that for the assay process potato starch is to be preferred, but care should be taken to select a neutral starch, that on the market being frequently acid in character.

Dr. Kebler expressed the opinion that the only satisfactory diastasic method is one which will take into consideration the products formed.

The U.S.P., Eighth Revision, and Its Relation to Some Drugs and Chemicals.

By A. R. L. Dohme and H. Engelhardt.

Some reasons were given why corrections in the U.S.P. were necessary. Experiences in the application of the U.S.P. to acetphenetidin, aloin, amyl nitrite, asafetida, benzoic and boric acids, belladonna leaves and root, cerium oxalate, cinchona and its fluidextract, coca leaf, colchicine, copaiba, ether, hyoscine hydrobromide, jalap, quinine salts, santal oil, resin scammony and spirit of nitroglycerin, were described.

A Review of the Literature on the Estimation of Alkaloids for the Year of 1906.

By W. A. Puckner.

An attempt was made to facilitate the work of those interested, and to present the advances made in this important field. Important contributions to the estimation of alkaloids which have appeared in foreign journals were given in considerable detail. American publications, being more easily accessible, are referred to rather briefly. Reference was made to publications dealing with the estimation of alkaloids in general, followed by an account of the work done in the valuation of aconite, the mydriatic drugs, cinchona, coca, caffeine-bearing drugs, colchicum, ergot, gelsemium, hydrastis, nux vomica, opium, physostigma, pilocarpus and veratrum. This was followed by a discussion on the assay processes of the U.S.P.

The Importance of a True Conception and Expression of Atomic Combining Values.

By Oscar Oldberg.

The author spoke of the importance of recognizing the intimate relations of electricity and chemistry, and summarized his deductions as follows: Atomic combining values are not fully represented by valence. The use of algebraic expressions of combining value aids greatly in understanding chemical changes. Positive and negative elements can be identified according to their relative positions in the periodic system of classification. The combining values of negative elements are constant. A new periodic table is presented which masses the typical elements about the newly discovered gaseous elements of the atmosphere, which occupy the center of the table, with the negative elements to the left and the most pronouncedly positive elements to the right.

The paper was discussed by Messrs. Puckner, Asher, Sadtler, Coblentz and Charles E. Caspari, one of the questions which arose being the relative importance of teaching theoretical and practical chemistry in colleges of pharmacy.

Some Notes on the Classification of the Principal Inorganic Compounds.

By Oscar Oldberg.

The author considered the modern definitions of acids, bases and salts based on the theory of ionization, objecting to the classification of the halides and sulphides of metals as "salts," and the corresponding hydrogen compounds as "acids," because this classification ignores structure. He said the properties, including those dependent upon ionization and hydrolysis, should receive due consideration, but not at the expense of structural analogy. A too general classification is less valuable than one which differentiates between compounds of decidedly different structure, without ignoring similarities of general behavior.

Poison Sumac (Rhus Venenata).

By A. B. Stevens and L. E. Warren.

This valuable contribution will appear in the November number of this Journal.

Professor Stevens also described a simple apparatus for the estimation of both the alcohol and camphor in spirit of camphor, which was devised by James Seymour.

A Pharmacological Study of Cannabis Americana.
By E. M. Houghton and H. C. Hamilton.

The authors find that Houghton's method for determining the physiological activity of *Cannabis sativa* by internal administration to especially selected dogs is reliable when the standard dose, ·010 per kilo body weight, is tested in comparison with the same quantity of a standard preparation of known strength. Furthermore, *Cannabis sativa*, when grown in various localities of the United States and Mexico, is found to be fully as active as the best imported Indian grown *Cannabis sativa.*

On Marrubiin.
By H. M. Gordin.

In a preliminary report the author states that marrubiin has the formula $C_{21}H_{28}O_4$; it melts at 154·5–155·5°; it is very easily soluble in acetone, chloroform, pyridine, warm phenol and hot alcohol; difficultly soluble in ether, benzene and cold alcohol. It requires for solution about 60 parts of cold alcohol and about 20,000 parts of cold water. It is dextrorotatory. It is not affected by cold aqueous or alcoholic potassium hydroxide. When boiled with alcoholic potassium hydroxide for a short time, marrubiin is hydrolyzed, taking up a molecule of water and becoming converted into an acid which he has named marrubic acid. Marrubic acid has the formula $C_{21}H_{30}O_5$; it melts at 173–174° C., is dextrorotatory and forms easily soluble salts, none of which could be obtained in crystalline form. While marrubiin does not reduce Fehling's solution or ammoniacal silver nitrate, marrubic acid reduces them both very readily. The acid is monobasic and forms esters of which the methyl and ethyl compounds crystallize easily.

Oil of Hamamelis Virginiana.
By Wilbur L. Scoville.

Two samples of oil, obtained from different lots of the grease or crude distillate, were examined and showed the following characteristics: Specific gravity, at 25° C., 0·8984 and 0·8985; refractive

index, at 20° C., 1·4830 and 1·4892; optical rotation, + 4·6 and + 5·05; saponification equivalent, 3·80; saponification equivalent, after acetylization, 30·3. The greater portion of the oil distilled between 250° C. and 263° C. Ten volumes of official alcohol were required for solution at 25° C. The oil evidently consists chiefly of a terpene, with a small proportion of an alcohol (about 7 per cent.), and a still smaller amount of an ester.

Progress in the Synthesis of Adrenalin.
By Joseph L. Turner.

The paper embodied a review of research on adrenalin, its chemical constitution, and attempts to produce it synthetically. The author has, in conjunction with C. E. Vanderkleed, accomplished a synthesis of adrenalin along lines entirely different from those thus far recorded. The method was not given.

The Synthesis of Camphor.
By A. R. L. Dohme.

The author considered the reasons for endeavoring to synthesize camphor and the advantage of the same to the public. The laboratory of Professor Behal, his personality and method of work, were described, and attention called to the advance of French chemists over American from the standpoint of benefit to humanity as against benefit to science. The history of the synthesis of camphor and details of leading methods were given. Behal's method of synthesis was described and its advantages pointed out.

The Production of Camphor.
By A. R. L. Dohme.

The author stated that about 80 per cent. of the camphor on the market comes from Japan, while China supplies but 20 per cent. He said that the island of Formosa furnishes the larger proportion of Japanese camphor, but it is difficult to obtain, depending upon the fact that the region where the trees grow is sickly and the natives are savage. The principal refinery of the Chinese is at Foochow. Both China and Japan have taken measures to protect the camphor industry, China having passed a law that for every tree cut down, five shall be planted in its place. Japan is also planting trees, and has passed a law that no trees less than fifty years

old shall be cut down. About 10,000,000 pounds of camphor are produced annually by the two countries. About 70 per cent. of the camphor produced is used in the manufacture of celluloid. The B grade of camphor contains camphor oil and water, while the BB grade is of fine quality.

Kefir and Its Manufacture.
By I. V. S. Stanislaus.

The author stated that the origin of kefir grains is not definitely known. It was formerly the custom not to sell them, because there was a belief that the remaining grains would lose their fermentative properties. He said that kefir is not like koumiss prepared from mare's milk by the Tartars.

Examination of Some Samples of Hexamethylene-Tetramine.
By Daniel Base.

The brands examined were Aminoform, Formin, Cystogen, Urotropin and Hexamethylene-tetramine. With one exception, all were found pure and, therefore, equally suited for medication.

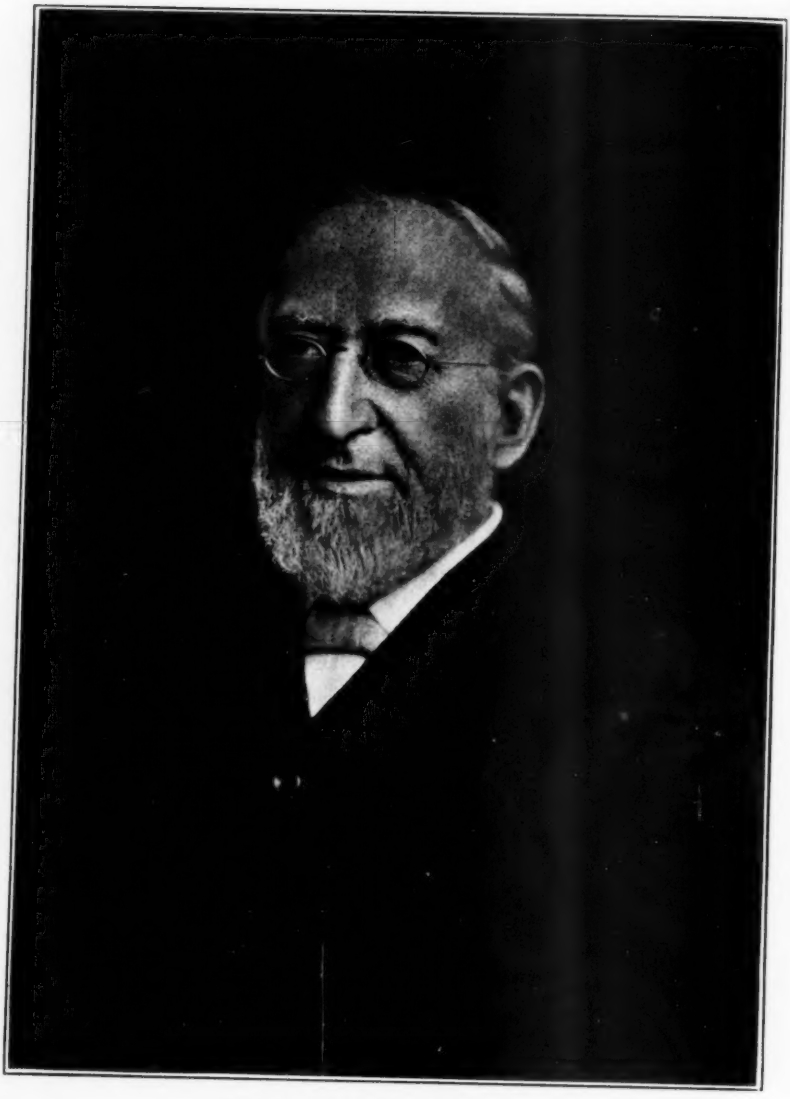
Opium Assay with Use of Lead Subacetate.
By C. E. Parker.

A modification of the pharmacopœial method of assay was given whereby the morphine may be more nearly completely precipitated and in a suitable condition for titration.

A Mechanical Agitator for Drug Assaying.
By C. E. Parker.

A simple, compact agitator for drug assays, with a modification for producing the intermittent agitation required in the official pepsin assay, was described.

[*To be continued.*]



JAMES THORNTON SHINN.
1834—1907.

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